



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/771,074

02/03/2004

Joel F. Zuhars

137782 (MHM -
15221US01)

1973

23446 7590 03/20/2007
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

EXAMINER

BITAR, NANCY

ART UNIT

PAPER NUMBER

2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

03/20/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/771,074	ZUHARS ET AL.	
	Examiner	Art Unit	
	Nancy Bitar	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/23/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 05/23/05 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the publication numbers (2002/0172328; and 2003/052879) are incorrect. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Strobel et al (US 7050844).

As to claim 1, Strobel et al. teaches a method of performing instrument tracking on an image (recognize the position of the instrument, column 2, lines 29-31) comprising:

collecting at least one image; computing at least one of a position and orientation of at least one instrument for said at least one collected image (step V; coordinates of the two projection images that describe the position of the picture element in the image, figure 1, column 6, lines 3-11);

and displaying at least one of said collected image, said at least one position and orientation of said at least one instrument and at least one image of said at least one instrument located at said at least one of a position and orientation (step VI; figure 1; presentation of the picture element at a monitor that defines the position as well the orientation).

As to claim 2, Strobel et al. teaches the method of claim 1 comprising collecting at least a plurality of 2D fluoroscopic images (note that the radiation detectors 6, 7 are fashioned as x-ray image intensifiers or as flat image detectors, column 6, lines 34-38).

As to claim 3, Strobel et al. teaches the method of claim 2 comprising continuously scrolling through said plurality of said collected images using a display (The reconstruction volume, i.e. the vessel tree 12, as well as the position of the catheter tip with the coordinates (x.sub.K, y.sub.K, z.sub.K), are then displayed at the monitor 9. The display is based on the common coordinate system (x, y, z). On the

Art Unit: 2624

basis of this display, the physician can recognize the exact spatial position of the catheter tip in the three-dimensionally presented vessel tree 12, column 7, lines 39-45).

As to claim 4, Strobel et al. teaches the method of claim 3 comprising projecting said at least one position and orientation of said at least one instrument into said plurality of collected images in sequence (spatial coordinates of a selected point of the instrument shown in the projection images are identified in a common coordinate system for the angiography projection images and the projection images, column 2, lines 40-51).

As to claim 5, Strobel et al. teaches the method of claim 1 comprising calibrating said at least one collected image such that said at least one position and orientation of said at least one image may be accurately displayed (FIG. 1 shows the executive sequence of the inventive method as a flow chart. In Step I, a calibration of the two C-arm systems with respect to a common coordinate system ensues first, with the two C-arm systems being moved into different positions around a calibration phantom, and the position-related projection matrices being acquired, column 5, lines 49-55).

As to claim 6, Strobel et al. teaches the method of claim 5 comprising selecting at least one calibrated image to be a current image (On the basis of these two-dimensional projection images, the spatial coordinates of a selected picture element of these two images, namely of the tip of the catheter shown in the images, are determined in Step V, column 6, lines 3-21).

As to claim 7, Strobel et al. teaches the method of claim 6 comprising computing said at least one position and orientation for said at least one instrument for said current

Art Unit: 2624

image (The determination of the coordinates and the actual image determination and output also is controlled with the image registration and calculating unit 8, column 6, lines 44-47).

As to claim 8, Strobel et al. teaches the method of claim 1 comprising collecting said at least one image using at least one moveable collection device (the C-arm is moved into two different angular positions for registering the projection images with the image planes residing differently relative to one another. In this embodiment of the invention, thus, only one C-arm is present with which the angiography projection images are registered first, column 3, lines 45-61, note that the physician is presented with the continuously occurring displacement motion of the instrument position).

As to claim 9, Strobel et al. teaches the method of claim 8 wherein said moveable collection device comprises a C-arm coupled to an imaging device (C-arm system, column 4, lines 32-34).

The limitation of claim 10 has been addressed above except for the following “performing instrument tracking on a series of 2 D images”. Strobel teaches that limitation in (column 6, lines 39-47; a number of two-dimensional angiography projection images are thereby registered)

As to claim 11, Strobel et al. teaches the method of claim 10 comprising collecting said series of 2D images using a collection device that moves (the C-arm is moved into two different angular positions for registering the projection images with the image planes residing differently relative to one another. In this embodiment of the invention, thus, only one C-arm is present with which the angiography projection images

Art Unit: 2624

are registered first, column 3, lines 45-61, note that the physician is presented with the continuously occurring displacement motion of the instrument position).

As to claim 12, Strobel et al. teaches the method of claim 11, wherein said collection device comprises a C-arm coupled to the imaging device (C-arm system, column 4, lines 32-34).

As to claim 13, Strobel et al. teaches the method of claim 13 wherein said series of 2D images comprise a series of 2D fluoroscopic image (note that the radiation detectors 6, 7 are fashioned as x-ray image intensifiers or as flat image detectors, column 6, lines 34-38).

As to claim 14, Strobel et al. teaches the method claim 10 comprising continually scrolling through said series of images in a display (FIG. 1 shows the executive sequence of the inventive method as a flow chart. In Step I, a calibration of the two C-arm systems with respect to a common coordinate system ensues first, with the two C-arm systems being moved into different positions around a calibration phantom, and the position-related projection matrices being acquired, column 5, lines 49-55).

As to claim 15, Strobel et al. teaches the method of claim 14 comprising projecting said at least one position and orientation of said at least one instrument into at least one image of said series of images (spatial coordinates of a selected point of the instrument shown in the projection images are identified in a common coordinate system for the angiography projection images and the projection images, column 2, lines 40-51).

As to claims 16-17, Strobel et al. teaches the method of incrementing at least said current image and recomputing said at least one position and orientation of said at least one instrument (In order to then determine the x, y and z-coordinates of the catheter tip in the coordinate system (x, y, z) of the reconstruction volume, i.e. of the vessel tree 12, the known projection matrices describing the positions of the two C-arm systems 2, 3, as well as the image coordinates (u.sub.6, v.sub.6) and (u.sub.7, v.sub.7), are determined. The spatial coordinates (x.sub.K, y.sub.K, z.sub.K) describing the spatial position then can be calculated by matrix calculation; column 7, lines 30-38).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Zylka et al (US 6,542,770) is cited to teach a method for determining the position of a medical instrument partially introduced into an object to be examined, in a three-dimensional image data set of the object to be examined, and also relates to a device for carrying out such a method.

Gundel et al (US 2006/0269113) is cited to teach sequence of 2D slice images of a subject volume are acquired with the imaging modality, image data for the 2D slice images are reconstructed from the measurement data, and the image data are post-processed for generation and display of one or more secondary images, and wherein

Art Unit: 2624

the post-processing and display is begun on the basis of already-reconstructed image data before all image data are completely reconstructed for the 2D slice images.

Zheng et al (US 2004/0111024) is cited to teach a C-arm X-ray device that display 2D fluoroscopic images in order to prepare a three-dimensional representation of a bone or portion thereof from imaging data.

Inquiries

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nancy Bitar whose telephone number is 571-270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on 571-272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/771,074

Page 9

Art Unit: 2624

Nancy Bitar

03/17/2007



JOSEPH MANCUSO
SUPERVISORY PATENT EXAMINER